

**Fiscal Year 2010 Work Plan
Water Quality Academic Advisory Committee**

Prepared for the

Virginia Department of Environmental Quality
Office of Water Quality Programs

Submitted by

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Freshwater Nutrient Criteria for Wadeable and Non-Wadeable Streams/Rivers

Goals and Objectives

The AAC will continue to provide assistance to Virginia DEQ in developing a scientifically sound and workable approach to nutrient criteria in freshwater streams and rivers. The goal of AAC FY10 AAC activities is to continue its work on freshwater nutrient criteria for streams and rivers and build on AAC work that was initiated during FY06-FY09.

The major objective for FY10 activities is to provide assistance to the DEQ Office of Water Quality Programs for the development of freshwater nutrient criteria for Virginia's wadeable and non-wadeable freshwater streams and rivers. FY10 work plan and specific tasks to be accomplished are described below.

Work Plan

Task 1. Wadeable Streams

Proposed tasks are intended to further develop the nutrient criteria screening value approach, including the definition of screening (and critical?) values and analysis of potential effects of nutrient criteria implementation on DEQ water monitoring resources if the Screening Value approach is to be used.

- 1a. Conduct formal evaluation of DEQ Probabilistic Monitoring data to derive potential screening values for TN and TP using the method applied as an illustrative example through analysis of the 2001-06 probmon data and discussed at the March AAC-DEQ meeting.

DEQ will provide the following data: 2001-2008 probabilistic monitoring data, including stream habitat, benthic algae, and streambed stability scores; description of process and procedure used to derive streambed stability.

- 1b. Explore potential and/or develop a rationale for defining critical values for TN and TP that considers and are intended to mitigate the "downstream loading" impacts of nutrients transported by Virginia streams to nutrient-sensitive receiving waters (Chesapeake Bay, Albemarle Sound, Gulf of Mexico via Tennessee and Ohio rivers).
- 1c. Conduct an analysis of how screening (and critical?) values derived from single point-in-time data series, such as Probmon, can be applied within a multiple-observation assessment framework, such as DEQ will be administering as it applies nutrient criteria using ambient monitoring data. An essential question to be asked is: How should the screening/critical

values be defined when analyzing the ambient monitoring database (e.g., as 12, 24, or 36 month medians? Using the 10% rule?)

DEQ will provide the following data: water and biological monitoring data for all Mountain and Piedmont Ecoregion wadeable stream locations where available:

- (1) Benthic macroinvertebrate assessment, and associated habitat assessment
- (2) Water monitoring data for 36 months prior to the biological monitoring observation from the biological monitoring stations where 5 or more TN, and/or 5 or more TP observations are available.
- (3) The water monitoring data would include water monitoring site descriptive data (lat long, ecoregion, stream name, etc.), measured nutrient concentrations, and all available parameters used by DEQ in defining "Reference Sites" in the SCI validation studies (Specific conductivity, DO, pH, % urban area [if available].)

- 1d. Conduct an analysis of how definition of screening (and critical?) values for nutrient criteria as per task 1a (and task 1b?) would be likely to affect DEQ water monitoring staff time and resources.

DEQ will provide the following data: This analysis could be conducted using the same database described in Task 1c, or it could be conducted using a more complete ambient water-monitoring data record for Mountain and Piedmont stations over a defined period – 36 months or longer.

- 1e. Optional, based on DEQ water quality standards and biological monitoring staff preferences: Continue to advise and coordinate with DEQ Biological Monitoring staff, as they further develop, streamline, and apply a visual assessment procedure to identify visually impaired sites. Such activity may include analysis of correct assessment rates for 2009 and early 2010 visual assessment activities.

Task 2. Non-Wadeable Streams

Statistically significant relationships have been documented (Garman and Shuart 2009) among TN, Chlorophyll-a, and to a lesser degree TP, and fish community-based (INSTAR) stream health metrics using an expanded database (n=35,000 records, DEQ ambient monitoring) of all Chesapeake basin watersheds (6th-order HUCs) in Virginia. Some of these relationships (e.g. Chl-a) were highly significant predictors of both healthy and degraded stream assemblages and might reasonably serve as the basis for establishing biologically valid nutrient criteria. Some of the strong associations between nutrients and trophic status and fish community structure at watershed scales were corroborated by analysis of a much smaller database of paired, non-wadeable streams and rivers. Specifically, fish community metrics were strongly and negatively correlated with TN and Chl-a concentrations in 77 putative non-wadeable streams. Proposed tasks for FY10 are intended to further develop the nutrient criteria for non-wadeable streams:

- 2a. Explore documented differences between responses of coastal *versus* non-coastal

stream fish assemblages to nutrient and trophic status to evaluate whether or not the geographic differentiation warrants separate nutrient criteria for coastal versus non-coastal streams and rivers.

- 2b. Expand the limited, existing paired database for nonwadeable streams and rivers (Garman and Shuart 2009) through additional data mining and GIS analysis and attempt to refine proposed nutrient criteria for TN and Chl-a based on this expanded coverage.
- 2c. In collaboration with AAC and DEQ, assist with the development of a formal proposal to EPA Region III for funding that could leverage ongoing fieldwork (e.g. DEQ's ProbMon Program) and develop a separate and synoptic database of nutrient and fish community metrics for validating proposed nutrient criteria for non-wadeable streams in Virginia.

Task 3. Preliminary Investigation of Class VII Waters

The objective of Task 3 is to initiate preliminary investigation regarding a way to assess DO in Class VII waters or establishing surrogates for DO in Class VII waters (swamps). Factors likely affecting DO include: temperature; reaeration; and organic matter. AAC in collaboration with DEQ will identify data needs and create an inventory of available data.

Task 4. Meetings

4a. AAC members will meet with DEQ water quality standards staff to discuss nutrient criteria development during winter or spring of 2010.

4b. AAC representative(s) will participate in meetings scheduled by DEQ to inform stakeholders of nutrient criteria development progress.

4c. AAC representative will attend the EPA Region 3 RTAG meeting if scheduled in FY10 to present the AAC's findings and recommendations on approaches for Virginia's development of nutrient criteria for freshwater rivers and streams.

Budget: \$25,000